

WHAT IS CLAIMED IS:

1. A system for steering a vehicle whereof steering of all the steerable wheels is controlled by an actuator specific thereto, the system having at least one lever for controlling the steering available to the driver in order to affect the trajectory of the vehicle, each steerable wheel being provided with measuring means allowing the steering angle of the said steerable wheel to be estimated, the system having:

a controller which has at least a normal mode of operation in which, for each steerable wheel, the controller determines a set point for the normal steering angle at least as a function of the driver's operation of his or her control lever and having at least a degraded mode activated in the event of failure of a wheel actuator;

means for detecting the failure of a wheel actuator which activates the said degraded mode and transmits to the controller the location on the vehicle of the wheel whereof the actuator has failed;

in which system, in the degraded mode activated in the event of failure of a given wheel actuator, the controller determines at least one compensating steering set point for another steerable wheel.

2. A steering system according to Claim 1, in which the compensating steering set point relates to the opposing steerable wheel on the axle having a failed steerable wheel.

3. A steering system according to Claim 1 or 2, in which the value of the compensating steering set point depends on the difference, both as regards size and sign, between the normal steering angle which is calculated and the steering angle measured on the steerable wheel whereof the actuator has failed.

4. A steering system according to Claim 1 or 2, in which the compensating steering set point depends on the location of the wheel whereof the actuator has failed, the location being either on the left-hand side of the vehicle or on the right-hand side of the vehicle, in relation to the yaw movement of the vehicle oriented either to the left or to the right.

5. A steering system according to Claim 3, in which the compensating steering set point depends on the location of the wheel whereof the actuator has failed, the location being either on the left-hand side of the vehicle or on the right-hand side of the vehicle, in relation to the yaw movement of the vehicle oriented either to the left or to the right.
6. A steering system according to Claim 1 or 2, in which, when the degraded mode is activated on failure of a single wheel actuator of a given axle, the controller determines in addition one compensating braking set point of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the steering control lever.
7. A steering system according to Claim 3, in which, when the degraded mode is activated on failure of a single wheel actuator of a given axle, the controller determines in addition one compensating braking set point of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the steering control lever.
8. A steering system according to Claim 4, in which, when the degraded mode is activated on failure of a single wheel actuator of a given axle, the controller determines in addition one compensating braking set point of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the steering control lever.
9. A steering system according to Claim 5, in which, when the degraded mode is activated on failure of a single wheel actuator of a given axle, the controller determines in addition one compensating braking set point of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the steering control lever.
10. A steering system according to Claim 1 or 2, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

11. A steering system according to Claim 3, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

12. A steering system according to Claim 4, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

13. A steering system according to Claim 5, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

14. A steering system according to Claim 6, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

15. A steering system according to Claim 7, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

16. A steering system according to Claim 8, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

17. A steering system according to Claim 9, in which, when the actuator of the front wheel on the inside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds to a same-sign fraction of the normal steering angle calculated for the steerable wheel whereof the actuator has not failed.

18. A steering system according to Claim 1 or 2, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

19. A steering system according to Claim 3, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

20. A steering system according to Claim 4, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

21. A steering system according to Claim 5, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

22. A steering system according to Claim 6, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

23. A steering system according to Claim 7, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

24. A steering system according to Claim 8, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

25. A steering system according to Claim 9, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

26. A steering system according to Claim 10, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

27. A steering system according to Claim 11, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

28. A steering system according to Claim 12, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

29. A steering system according to Claim 13, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

30. A steering system according to Claim 14, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

31. A steering system according to Claim 15, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

32. A steering system according to Claim 16, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.

33. A steering system according to Claim 17, in which, when the actuator of the front wheel on the outside as the vehicle turns fails, the compensating steering set point is a steering angle which corresponds substantially to the normal steering angle calculated for the steerable wheel whereof the actuator has not failed, with the system moreover actuating the brake of at least one wheel of the vehicle on the side of the vehicle towards which the driver wants to orient the vehicle in accordance with his or her operation of the control lever.
34. A steering system according to Claim 1 or 2, in which the wheel actuators are electrical.
35. A steering system according to Claim 3, in which the wheel actuators are electrical.
36. A steering system according to Claim 4, in which the wheel actuators are electrical.
37. A steering system according to Claim 5, in which the wheel actuators are electrical.
38. A steering system according to Claim 6, in which the wheel actuators are electrical.
39. A steering system according to Claim 7, in which the wheel actuators are electrical.
40. A steering system according to Claim 8, in which the wheel actuators are electrical.
41. A steering system according to Claim 9, in which the wheel actuators are electrical.
42. A steering system according to Claim 10, in which the wheel actuators are electrical.
43. A steering system according to Claim 11, in which the wheel actuators are electrical.
44. A steering system according to Claim 12, in which the wheel actuators are electrical.
45. A steering system according to Claim 13, in which the wheel actuators are electrical.
46. A steering system according to Claim 14, in which the wheel actuators are electrical.
47. A steering system according to Claim 15, in which the wheel actuators are electrical.
48. A steering system according to Claim 16, in which the wheel actuators are electrical.
49. A steering system according to Claim 17, in which the wheel actuators are electrical.

50. A steering system according to Claim 18, in which the wheel actuators are electrical.
51. A steering system according to Claim 19, in which the wheel actuators are electrical.
52. A steering system according to Claim 20, in which the wheel actuators are electrical.
53. A steering system according to Claim 21, in which the wheel actuators are electrical.
54. A steering system according to Claim 22, in which the wheel actuators are electrical.
55. A steering system according to Claim 23, in which the wheel actuators are electrical.
56. A steering system according to Claim 24, in which the wheel actuators are electrical.
57. A steering system according to Claim 25, in which the wheel actuators are electrical.
58. A steering system according to Claim 26, in which the wheel actuators are electrical.
59. A steering system according to Claim 27, in which the wheel actuators are electrical.
60. A steering system according to Claim 28, in which the wheel actuators are electrical.
61. A steering system according to Claim 29, in which the wheel actuators are electrical.
62. A steering system according to Claim 30, in which the wheel actuators are electrical.
63. A steering system according to Claim 31, in which the wheel actuators are electrical.
64. A steering system according to Claim 32, in which the wheel actuators are electrical.
65. A steering system according to Claim 33, in which the wheel actuators are electrical.